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Indian Standard

CROP PROTECTION EQUIPMENT — BATTERY OPERATED ROTARY ATOMISER DISC TYPE ULV SPRAYER — SPECIFICATION

ICS 65.060.40

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 1997

Price Group 2

Crop Protection Equipment Sectional Committee, FAD 25

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Crop Protection Equipment Sectional Committee had been approved by the Food and Agriculture Division Council.

Ultra Low Volume (ULV) techniques with relatively oil based formulations are essential for treating large scale areas rapidly and cost effectively with ground equipment capable of controlled droplet application, particularly with contact acting pesticides, where only the optimal droplet size for the spray target is used. Rotary atomisers provide effective means of controlling droplet size. With the indegenous manufacturing of these type of sprayers and to guide the manufacturers to provide quality sprayers, this standard has been developed. The requirements of droplet size, thread size of the bottle and bottle holder and temperature rise test for the micromotor will be incorporated later on after getting sufficient data and method of tests.

The figures given in the standard are meant only for illustration purposes. These should not be considered as suggestive of any standard design.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CROP PROTECTION EQUIPMENT — BATTERY OPERATED ROTARY ATOMISER DISC TYPE ULV SPRAYER — SPECIFICATION

1 SCOPE

This standard prescribes material, performance, constructional and other requirement of battery operated rotary atomiser disc type Ultra Low Volume (ULV) sprayer used for spraying pesticides.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
7201(Part 1) : 1987	Method of sampling for agricultural machinery and equipment: Part 1 Hand tools and hand operated animal-drawn equipment (*first revision*)
7572 : 1974	Guide for testing single-phase ac and universal motors
8480 : 1996	Glossary of terms related to crop protection equipment (*first revision*)

3 TYPES

Depending upon the application of spray liquid the battery operated rotary atomiser disc type ULV sprayers are of two types:

Type 1 For insecticide application (*see* Fig. 1).
Type 2 For weedicide application (*see* Fig. 2).

4 TERMINOLOGY

For the purpose of this standard, the following definitions in addition to those given in IS 8480 shall apply (*see* Fig. 1 to 4):

4.1 Atomiser Disc

A device having number of radial grooves ending in sharp pointed teeth on the periphery through which liquid is sprayed out with centrifugal force resulting in fine droplets.

4.2 Mass

The mass of the complete sprayer assembly without any liquid in the tank without backpack assembly including batteries.

4.3 Tank/Bottle

A container for holding the spray liquid.

4.4 Tank/Bottle Capacity

The volume of the tank/bottle when spray liquid is filled to its neck level, the tank/bottle being duly equipped with all its internal mountings.

4.5 Backpack

A device made out of plastic to contain spray liquid. The device also has tube with a valve to provide outlet with controlled flow rate.

4.6 Spray Pattern

Geometrical appearance of spray droplets coming out of sprayer.

5 MATERIAL

The material of construction of various components of the sprayer shall be selected from col 3 of Table 1.

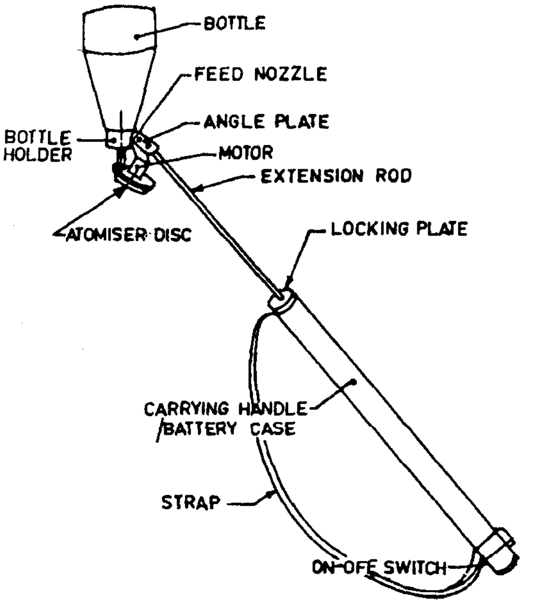

FIG. 1 BATTERY OPERATED ROTARY ATOMISER ULV SPRAYER, TYPE 1

Table 1 Materials of Construction of Various Components

(*Clause* 5)

Sl No.	Components	Material
(1)	(2)	(3)
i)	Tank/bottle	HDPE
ii)	Cap of bottle/tank	PP/HDPE
iii)	Battery case	Rigid PVC/HDPE
iv)	Atomiser disc	Engineering plastics
v)	Atomiser protective cover	Plastics
vi)	Motor housing	Plastics
vii)	Bottle holder	Plastics
viii)	Feed nozzle	Plastics, stainless steel
ix)	Motor seal	Synthetic rubber/PVC
x)	Strap	Woven web cotton/ synthetic yarn
xi)	Valve	Plastic/SS/brass
xii)	Strainer	SS/plastics
xiii)	Hose clips	Steel
xiv)	Hose	PVC
xv)	Gasket	Synthetic rubber/PVC/fibre/leather

6 PERFORMANCE REQUIREMENTS

6.1 Discharge Rate

The discharge rate varies depending upon the orifice size of the nozzle. The nominal discharge rate shall be marked on the stainless steel nozzle and shall be indicated with colour code in case of plastic nozzles. The discharge rate when measured in accordance with **6.1.1** and colour codes for different nozzles shall be as under:

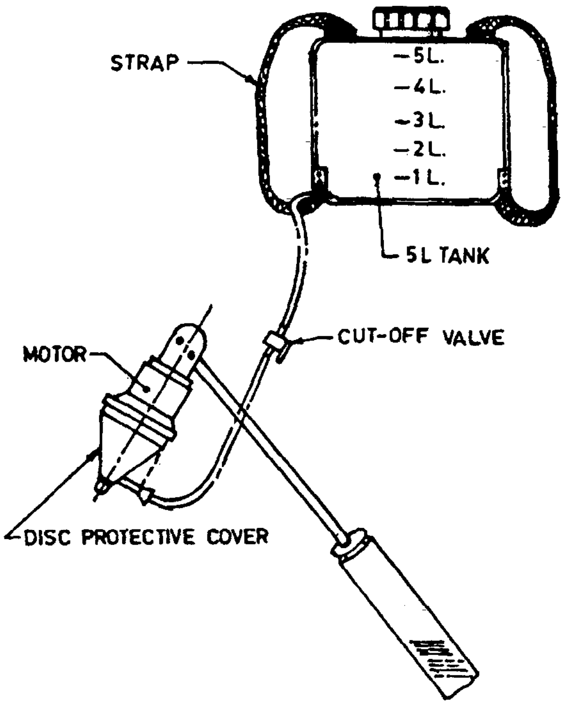

FIG. 2 BATTERY OPERATED ROTARY ATOMISER ULV SPRAYER, TYPE 2

Colour Code	*Nominal Discharge Rate* ml/min	*Tolerance,* Percent
White	90	± 10
Red	65	± 10
Orange	40	± 10
Yellow	25	± 10
Blue	17.5	± 10

6.1.1 To measure discharge rate insert one of the nozzles into the sprayer, fill the bottle with water and attach it on the sprayer. Keep the sprayer in such a position so as the bottle remains in vertical position. Allow the water to run through the nozzle by gravity into a measuring jar and note the time required to empty the bottle. Calculate the discharge rate in ml/min. Repeat the test for other sizes of the nozzles.

6.2 Test for Micromotor

6.2.1 The rated voltage of the DC micromotor shall be declared by the manufacturer. When tested as per IS 7572 at rated voltage the micromotor shall not draw more than 350 mA at no load (with atomiser disc) and 500 mA at full load, that is, when spraying at maximum discharge rate.

6.2.2 The rated speed at rated voltage of the DC micromotor shall be declared by the manufacturer. The declared value of rated speed shall not be less than 6 000 rev/min for Type 1 sprayers and 2 000 rev/min for Type 2 sprayers at rated voltage.

The actual speed of micromotor when measured at rated voltage shall not vary by more than 1 percent from the declared value of rated speed.

6.2.3 The life of one set of batteries shall be such that after 6 h continuous running of the sprayer at no load (with atomiser disc) the speed of the motor shall not drop by more than 15 percent from the initial observed speed.

7 CONSTRUCTIONAL REQUIREMENTS

7.1 Bottle

The Type 1 sprayers shall be provided with a bottle having capacity of 500 ml or 1 000 ml with a tolerance of ±10 percent.

7.2 Dispenser Brush

A small soft hair brush may be provided on which the liquid from the bottle drips and the brush barely touches the atomiser disc. This acts as a device which spreads the liquid on the spinning disc. This device prevents uneven spray of the liquid from the sprayer.

7.3 Battery Case

The sprayer shall be provided with a case or carrying handle to accommodate 6 dry cells of R 20 size.

7.4 Angle Plate

Provision for changing the angle of the spray head by locking it in the appropriate slot may be provided in the angle plate.

7.5 Atomiser Disc

The atomiser disc shall be of 50 mm minimum outside diameter.

7.6 Mass

The mass of the sprayer (*see* **4.2**) shall not exceed 2 kg.

8 OTHER REQUIREMENTS

8.1 Manual

The manual shall include technical specifications of the sprayer, material of construction of various components shown in the exploded view of the sprayer, instructions for operations and maintenance, common faults and their remedies and safety precautions.

8.2 Spare Parts

Spare parts separately packed for each sprayer according to the number required by the purchaser shall be provided. Even if no demand for spare parts has been made, a set of nozzles shall be provided with each sprayer.

8.3 Backpack

Type 2 sprayers shall be provided with a backpack accessory. As an option, the Type 1 sprayer may also be supplied with a tank of backpack accessory (*see* Fig. 3) having a capacity of 5 litres or 10 litres with a tolerance of ±0.50 litres.

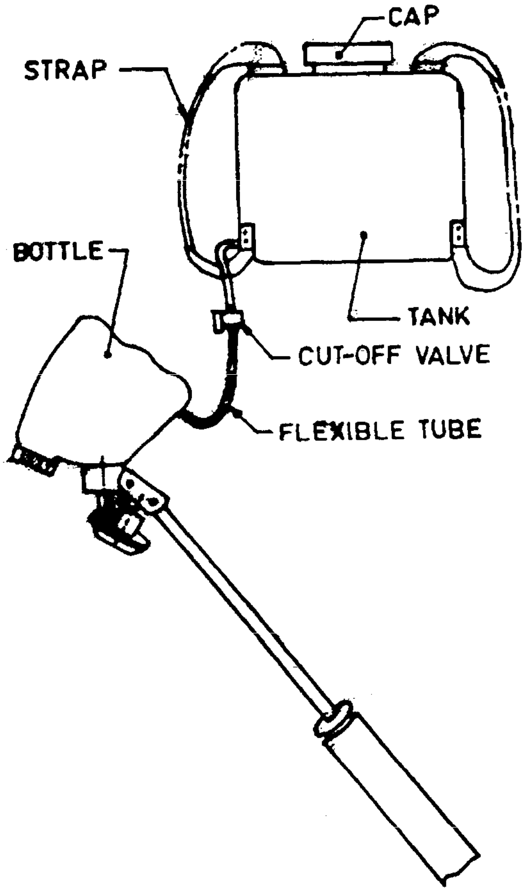

FIG. 3 BACKPACK ACCESORY TO ULV SPRAYER, TYPE 1

8.3.1 The material of construction of the backpack shall be resistant/inert to pesticide formulations. There shall be no sweating of the pesticide liquid from the wall of the backpack.

8.3.2 The backpack shall be provided with a strainer with a holding tube so that the contact of the spray mix is prevented with the hand and fingers while filling the backpack.

8.3.3 An air valve on the cap of the backpack shall be provided to prevent the liquid from spilling on the neck and back of the operator if and when he bends over.

8.3.4 The backpack lid shall have a gasket to prevent the liquid from coming out of the cap.

8.3.5 The design and construction of the cap, neck and shoulder of the backpack should be such so as not to allow any spray fluid to accumulate on the top and around the neck of the tank which may run over and contaminate the body of the operator.

8.3.6 *Straps*

Two straps of not less than 800 mm, when adjusted to maximum possible length and 38 mm in width shall be provided in order to help carriage of the backpack. Provision for adjustment of the length of each strap shall also be provided.

9 WORKMANSHIP AND FINISH

All the components shall have a smooth finish and shall be free from pits, burrs, sharp edges and other defects that may be detrimental to the user.

10 MARKING AND PACKING

10.1 Marking

Each sprayer shall be marked with the following:

a) Manufacturer's name or recognized trade-mark, and
b) Batch or code number.

10.2 BIS Certification Marking

Each sprayer may also be marked with the Standard Mark.

10.2.1 The use of the Standard mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

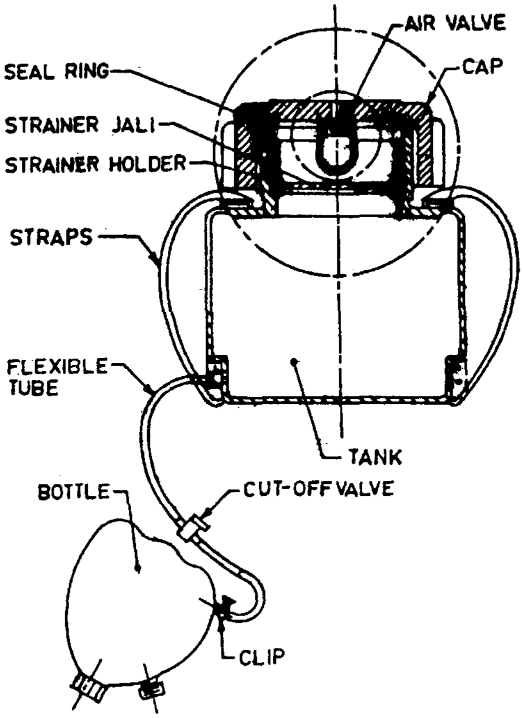

FIG. 4 SECTIONAL VIEW OF BACKPACK

10.3 Packing

Each sprayer shall be packed in individual cartons for safe handling in transit.

11 SAMPLING FOR LOT ACCEPTANCE

Unless otherwise agreed to between the purchaser and the supplier, sampling of the sprayers for lot acceptance shall be done in accordance with 3 of IS 7201 (Part 1).

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